Idiopathic Ascites after Laparoscopic Appendicectomy: A Review of Literature and A Case Report

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Abstract:

Introduction: Minimal access surgery, encompassing laparoscopy and robotic procedures, has become the preferred choice for a wide range of surgical interventions, receiving widespread acceptance from both surgeons and patients. However, as the utilization of these minimally invasive techniques continues to grow, surgeons are increasingly confronted with unforeseen and puzzling complications. One such rare and perplexing complication is the emergence of ascites following laparoscopic procedures, particularly when no accidental injury to the bowel or urinary system has occurred, posing a challenging and distressing scenario for the operating surgeon.

Aims and Objective: We have encountered a case of idiopathic ascites following a laparoscopic appendicectomy in a 10-year-old boy. The primary objective of this study is to conduct a comprehensive literature review to identify similar case reports and publications. By doing so, we aim to enhance our understanding of the causes and principles for managing idiopathic ascites occurring after laparoscopic surgery.

Methods: A 10-year-old boy was admitted to the hospital with typical symptoms of acute appendicitis. Following evaluation, a nearly bloodless and uneventful laparoscopic appendicectomy was performed. However, postoperatively, he developed ascites accompanied by scrotal swelling due to scrotal edema, and despite thorough evaluation, no identifiable cause was found. The patient was managed conservatively and fully recovered without any subsequent complications.

Results: The occurrence of ascites stemming from an idiopathic allergic or inflammatory peritoneal reaction during a laparoscopic procedure is exceptionally rare. During the patient's evaluation, the paramount concern was to rule out potentially significant complications such as bowel or urinary tract injuries, which can commonly result in postoperative peritoneal fluid accumulation. After the procedure, the boy underwent a thorough evaluation, but no definitive cause for the ascites was identified, further highlighting the enigmatic nature of this condition.

Conclusion: Postoperative ascites without a discernible cause following laparoscopic surgery is an unexpected complication. In such cases, the leading hypothesis points to a peritoneal inflammatory reaction induced by agents utilized during laparoscopy.

Key Words : Postoperative ascites, Laparoscopic surgery, Inflammatory peritoneal reaction.

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Introduction:

Minimal Access Surgery, encompassing laparoscopy and robotics, has become the preferred approach for various surgical interventions, earning approval from both surgeons and patients. However, the increasing utilization of minimal-access surgery has introduced a growing spectrum of unanticipated complications for treating surgeons. Among these, the emergence of ascites following laparoscopic procedures, in the absence of any unintentional injury to the bowels or urinary system, presents a notably rare, disappointing, and challenging scenario for surgeons. In this context, we present a case of idiopathic ascites following a laparoscopic appendicectomy in a 10-year-old Bangladeshi boy, shedding light on this unusual and complex clinical condition.

Case description:

Master Doha, a 10-year-old Bangladeshi boy, presented with a two-day history of abdominal pain and fever, accompanied by anorexia and nausea. His temperature was elevated at 100°F, and he had no significant prior

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surgical or medical history related to his current condition. Upon examination, tenderness in the right iliac fossa (RIF), with maximal tenderness at McBurney's point and rebound tenderness, was observed. His weight was 26 kg, and he had a 16 kg/m² BMI. Consequently, he was admitted to a hospital in Dhaka, Bangladesh, with a clinical diagnosis of acute appendicitis.

Preoperative routine investigations were conducted, and an emergency laparoscopic appendicectomy was planned. Blood tests revealed a hemoglobin level of 11 g/dL and a white blood cell count of 15 × 10y /L, indicative of neutrophilic leukocytosis. Abdominal ultrasound (USG) identified findings suggestive of acute appendicitis, with no other significant pathologies or evidence of ascites.

Operative Procedure

During the surgical procedure, the patient was placed under general anesthesia, and pneumoperitoneum was established using a closed technique. All other ports for laparoscopy were inserted under direct vision. The initial placement included a 10mm supraumbilical port, followed by a 10mm port in the left iliac fossa (LIF) and a 5mm port in the right subcostal region. A diagnostic laparoscopy was conducted, revealing the absence of free intraperitoneal fluid or ascites, and the upper abdominal viscera appeared unremarkable. The appendix was found to be inflamed, but there was no evidence of gangrene or an appendicular abscess.

The subsequent appendicectomy proceeded without complications, characterized by minimal bleeding, and an electrosurgical instrument (Thunderbeat) was employed during the procedure. Following the surgery, the patient was transferred to the postoperative ward for routine postoperative care.

The postoperative period initially appeared uneventful, except for the patient experiencing pain as a common post-surgical symptom. However, on the fourth postoperative day, the patient reported scrotal swelling. Clinical evaluation determined that it was scrotal edema, with no signs or symptoms of other causes of acute scrotum. Subsequently, an ultrasound of the scrotum and the entire abdomen was performed, revealing the presence of ascites along with scrotal edema, while no other pathological conditions were identified.

Renal and cardiac function remained within normal limits, and urine output was adequate. The case was thoroughly discussed and examined, including a review of the video clip of the laparoscopic procedure with expert surgeons and the patient's parents. A comprehensive array of investigations was carried out to explore potential causes and manage the patient's condition. This included complete blood count, serum amylase, thyroid function tests, serum protein profiles, serum electrolyte levels, liver and renal function tests, chest X-ray (CXR), and kidney-ureter-bladder (KUB) X-ray. All hematological, biochemical, and radiological investigations returned results within the normal range. Despite extensive efforts to identify the cause, no definitive explanation was found, and the patient's clinical condition remained stable. Consequently, a decision was made to proceed with conservative treatment.

Figure 1: *Inflamed Appendix on Diagnostic Laparoscopy*

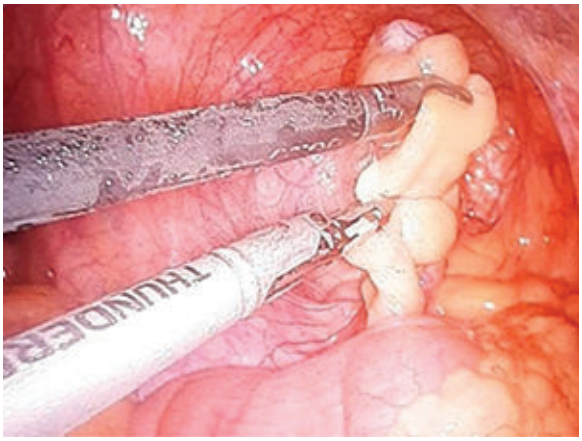

Figure 2 : *Laparoscopic Appendicectomy performed with the help of Electrosurgical instrument*

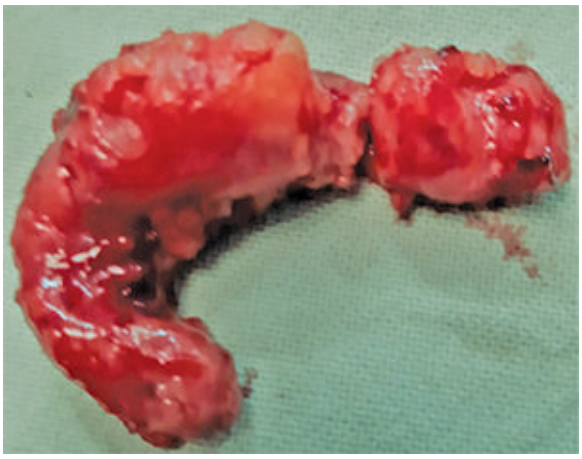

Figure 3 : *Resected specimen*

The patient's condition improved gradually, with scrotal edema resolving within two weeks. He fully recovered, returning to routine activities after the same period. Histopathological examination confirmed acute appendicitis as the cause.

Discussion and review of the literature

Ascites arising after an uncomplicated laparoscopic surgery is an exceedingly rare and distressing phenomenon for surgeons. One of the most common causes of postoperative peritoneal fluid accumulation following a laparoscopic procedure is bowel injury. Studies have reported the estimated incidence of bowel injury to be approximately 0–0.5%, with nearly half of these injuries occurring during the entry into the peritoneum [2].

Bowel or urinary tract injuries represent some of the most serious complications of laparoscopic surgery, as they can be potentially life-threatening if not identified promptly during the operation or in the early postoperative period [3–5]. For instance, iatrogenic injuries to the urinary tract are significant complications, especially following laparoscopic gynecological procedures [6,7,8]. Bladder injuries, in particular, have an estimated rate ranging from 0.02% to 8.3%, with the majority of these injuries occurring during hysterectomy operations. It is worth noting that identifying these injuries during surgery can be challenging, with approximately half of them going unrecognized at the time of the procedure [9].

Another complication observed after laparoscopic surgery is the collection of chyle in the peritoneal cavity, resulting from lymph duct injury. This complication is more common in extensive retroperitoneal surgery cases [10–12]. The peritoneal fluid in such cases, exhibits a distinctive appearance due to its high lipid content. Acute pancreatic ascites, though rare, were considered as a potential explanation for the development of ascites in our patient. However, this diagnosis was essentially ruled out due to the low levels of serum amylase and the absence of clinical features typically associated with acute pancreatitis.

In our case, the development of ascites could not be attributed to any of the common causes mentioned above. No evidence of bowel injury or urinary tract injury was found, and there were no clinical signs of peritonitis. Furthermore, the patient's bowel and bladder habits remained normal, and he remained afebrile and asymptomatic, except for the presence of ascites and scrotal swelling. Therefore, we attributed the development of ascites in this case to an idiopathic allergic or inflammatory peritoneal reaction triggered by the laparoscopic procedure. Given the absence of an identifiable underlying cause, the primary concern during the patient's evaluation was to exclude any life-threatening complications.

The development of ascites after an uncomplicated laparoscopic surgery, especially in the absence of evident injury to the bowel or urinary system, is an unexpected and perplexing complication. As a result, patients who exhibit such postoperative symptoms must undergo a thorough evaluation to identify the potential cause of the ascites and to rule out any iatrogenic visceral injury during laparoscopy. The presence of ascites after surgery necessitates a systematic investigation to ensure patient safety.

Literature reviews have suggested the possibility that peritoneal allergic or inflammatory reactions to agents used during laparoscopic surgery may be the underlying cause of idiopathic ascites after laparoscopic surgery in cases where visceral injury or other pathological conditions have not been identified [13–16]. Therefore, the primary objective of our study was to review the existing literature and case reports to understand this phenomenon better.

After conducting a systematic search on databases like PubMed, the Cochrane Library, and other online research resources, we did not identify any previous

reports or case studies documenting the development of postoperative idiopathic ascites following laparoscopic appendicectomy in a male patient. Our search led us to only one relevant case report published in Hindawi's journal (Volume 2014, Article ID 549791) and involved a twenty-five-year-old Caucasian female. Some publications have suggested the possibility that allergic reactions to chemical agents or carbon dioxide (CO_2) used during laparoscopy may be the underlying cause of idiopathic ascites after minimally invasive surgery [15, 16]. However, it's important to note that our patient did not receive any specific drugs or dyes during the laparoscopic procedure.

In our case, we speculate that substances used during the laparoscopy, such as carbon dioxide, light, heat, or diathermy, may have triggered an inflammatory response that contributed to the development of ascites following an otherwise uncomplicated laparoscopic surgery. Postoperative ascites of unknown origin after minimally invasive laparoscopic surgery is a rare and unexpected complication that presents a diagnostic challenge. In such cases, it is imperative to thoroughly evaluate and investigate patients to identify the potential cause and monitor their condition, thereby excluding the possibility of an iatrogenic visceral injury during laparoscopy.

When no definitive cause for the ascites can be identified, the most likely explanation is a peritoneal inflammatory reaction to agents or substances used during laparoscopy. While this condition remains infrequent, the reported cases highlight the need for further research to understand better the underlying mechanisms and risk factors associated with this perplexing complication.

The Management of idiopathic ascites following laparoscopic surgery often involves a conservative approach, as seen in our case. Monitoring the patient's clinical condition and supportive care can lead to a favorable outcome. However, continued vigilance and further investigation are necessary to ensure patient safety and improve our understanding of this rare complication, potentially paving the way for future preventive measures or alternative management strategies.

Conclusion

The occurrence of postoperative ascites with an unknown origin following minimally invasive surgery, particularly laparoscopy, is an exceedingly rare complication. Prompt examination and investigation are essential to identify potential causes and rule out iatrogenic visceral injuries during laparoscopy. When no definitive cause for the ascites can be pinpointed, it is plausible that a peritoneal inflammatory reaction to substances used during laparoscopy may be the most likely explanation. Further research is needed to enhance our understanding of this infrequent complication and guide its Management.

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